

17

The invention claimed is:

1. A machine for manufacturing gypsum board with a gypsum core covered with a sheet of paper for gypsum board liner, comprising:

a chute section having a slurry discharge port for feeding gypsum slurry for the gypsum core to a widthwise center part of a sheet of paper for gypsum board liner with a stable density and pressure;

a single mixer having a housing and a mixing area therein for the mixing of calcined gypsum and water for preparation of a gypsum slurry;

a hollow connector section having an inlet end opening directly to the mixing area for receiving the gypsum slurry directly from the mixing area and an outlet end opening directly to the chute section for providing a continuous flow of the gypsum slurry from the mixing area into the chute section by pressure of the mixer only, with a stable density and pressure;

a slurry delivery conduit having a stable slurry flow rate;

a slurry fractionation port disposed on a top wall of at least one of the chute section and the hollow connector section and in fluid communication with the slurry delivery conduit for receiving a part of the gypsum slurry from the mixer through at least one of the chute section and the hollow connector section, for continuously fractionating the received gypsum slurry in at least one of the chute section and the hollow connector section with a stable density and flow rate by the pressure of the mixer only, and for delivering the fractionated gypsum slurry to the slurry delivery conduit for at least one of a roll coater and a side edge portion of the sheet, by fluid pressure of the gypsum slurry only;

a valve for opening and closing the slurry fractionation port, and for controlling the pressure of the slurry fractionated through the slurry fractionation port; and

a casing which encloses the slurry fractionation port and the valve and which has a slurry delivery port, wherein the slurry delivery conduit is connected to the slurry delivery port so as to be in fluid communication with the slurry fractionation port through an internal area of the casing.

2. The machine as defined in claim 1, further comprising a foam feeding port, which adds foam or foaming agent to the gypsum slurry for regulating density of the slurry, disposed on at least one of said hollow connector section and said chute section.

3. The machine as defined in claim 2, wherein said foam feeding port is disposed on a downstream side of said slurry fractionation port.

4. The machine as defined in claim 3, wherein both of said foam feeding port and said slurry fractionation port are disposed on said chute section, and the slurry fractionation port is located, upstream of the foam feeding port in a direction of flow of the slurry.

18

5. The machine as defined in claim 1, wherein said slurry fractionation port is disposed on a top wall of at least one of said chute section and said hollow connector section.

6. The machine as defined in claim 1, further comprising a driving device and drive control means for operating said valve means to open or close.

7. A method for producing gypsum boards using the machine as defined in claim 1, comprising:

a slurry preparing step of feeding the calcined gypsum and water into the mixing area of the mixer, mixing them therein for preparation of the gypsum slurry, and displacing the gypsum slurry from said mixing area to said chute section via said hollow connector section;

a slurry fractionating step of causing a part of the slurry effluent from said mixing area to be fractionated in at least one of said chute section and said hollow connector section as fractionated slurry by the pressure of the mixer only, and feeding the fractionated slurry through said conduit to at least one of the roll coater and the side edge portion of a sheet of paper for gypsum board liner; and

a slurry discharging step of discharging a remainder of the gypsum slurry, from which the fractionated slurry has been fractionated, through said slurry discharge port of the chute section onto the center part of the sheet of paper for gypsum board liner, wherein at least one of a core of an edge portion of the gypsum board and an interface portion between a core and the sheet of paper for gypsum board liner is formed by said fractionated slurry.

8. The method as defined in claim 7, wherein foam or foaming agent for regulating density of slurry is mixed into said remainder of the gypsum slurry after the fractionated slurry has been fractionated.

9. The method as defined in claim 8, further comprising a fractionated slurry agitating step of agitating said fractionated slurry with use of a slurry agitator.

10. The method as defined in claim 7, further comprising a fractionated slurry agitating step of agitating said fractionated slurry with use of a slurry agitator.

11. A method for fractionating gypsum slurry with use of the machine as defined in claim 1, wherein a part of the gypsum slurry limited in a content of the foam or foaming agent is delivered through said slurry fractionation port to said slurry delivery conduit.

12. A method for fractionating gypsum slurry with use of the machine as defined in claim 1, wherein a fluid passage between said slurry delivery conduit and at least one of said chute section and said hollow connector section is periodically closed or opened by closing and opening operation of said valve means so as to prevent growth of a mass of set slurry in a fluid passage of the fractionated slurry.

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